aminopropyl)methylamine, and the LYSOTRACKER® probes which report intralysosomal pH as well as the dynamic distribution of lysosomes (Molecular Probes, Inc.)

Please replace the text at page 101 lines 10-14 with the following:

Mitochondrial labeling

In one embodiment, membrane permeant mitochondrial-specific luminescent reagents (Molecular Probes, Inc.) are used to label the mitochondria of living and fixed cells. These reagents include rhodamine 123, tetramethyl rosamine, JC-1, and the MITOTRACKER® reactive dyes.

In the claims:

Please cancel claims 1 and 18

Please add the following new claims:

~~19.~~ **(NEW)** An automated method for analyzing neurite outgrowth comprising

a) providing an array of locations comprising cells, wherein the cells possess at least a first luminescently labeled reporter molecule that reports on cell location, and at least a second luminescently labeled reporter molecule that reports on neurite outgrowth;

b) obtaining a nuclear image from the at least first luminescently labeled reporter molecule and a neurite image from the at least second luminescently-labeled reporter molecule;

c) automatically identifying cell bodies from the nuclear image;

d) automatically identifying neurites extending from the cell bodies from the neurite image; and

e) automatically determining one or more neurite features selected from the group consisting of:

i) Total neurite length from all cells;

ii) Total number of neurite branches from all cells;

iii) Number of neurites per cell;

iv) Number of neurites per positive neuron;

v) Neurite length from each cell;

vi) Neurite length per positive neuron;

vii) Neurite length per neurite;

viii) Number of cells that are positive for neurite outgrowth;

ix) Percentage of cells positive for neurite outgrowth;

x) Number of branches per neuron; and

xi) Number of branches per neurite.

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20. (NEW) The method of claim 19 wherein identifying cell bodies comprises the steps of:

A) generating a kernel image from the nuclear image;

B) performing conditional dilations of the kernel image to identify the cell body.

23
21. (NEW) The method of claim 20, wherein identifying neurites extending from cell bodies comprises the steps of:

I) generating a reservoir image from the neurite image; and

II) identifying positive pixels in the reservoir image that are not present in the cell bodies, wherein such positive pixels belong to neurites extending from cell bodies.

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22. (NEW) The method of claim 21, further comprising

(a) performing one conditional dilation of the kernel image to acquire a dilation image;

(b) determining a set of nodes from the dilation image;

(c) linking together connected nodes; and

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(d) repeating steps (a)-(c) until an entire neurite length has been traced.

23. (NEW) The method of claim 22, wherein steps (a) through (d) are carried out at multiple time points.

26
24. (NEW) The method of claim 19 further comprising contacting the neurons with a test compound, and determining an effect of the test compound on neurite outgrowth from the cell bodies.

27
25. (NEW) The method of claim 24, further comprising contacting the neurons with a neurotoxin either before, after, or simultaneously with the test compound.

28
26. (NEW) The method of claim 24, further comprising contacting the cells with a control compound known to stimulate neurite outgrowth, and determining whether the test compound inhibits the control compound from inducing neurite outgrowth from the cell bodies.

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27. (NEW) The method of claim 19, wherein steps b) through e) are carried out at multiple time points.

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28. (NEW) The method of claim 19 wherein the first luminescently labeled reporter molecule comprises a DNA binding compound.